

CLAIMS

1. Method for component verification in connection with operation of a component placement machine (101) having a series of feeder slots (103) for holding component
5 feeders (104) with feeder markers, each feeder marker carrying a unique feeder ID, wherein each feeder slot (103) has a unique slot ID (208), the method comprising
- determining (210) the actual feeder IDs carried by the actually installed feeders (104) in said series of feeder slots (103) and using this information in comparison with stored configuration information (201, 207) to check for configuration errors,
10 characterized in that the method comprises
- providing at least one camera (107) for providing an image (202) spanning over said series of feeder slots (103),
- providing said image and performing image analysis (205) on it for determining (210) the actual feeder IDs carried by the actually installed feeders (104) in said series
15 of feeder slots (103).
2. Method according to claim 1, wherein said method steps are repeated continuously before start of operation of said machine, during operation of said machine, or both before start of operation and during operation of said machine.
- 20 3. Method according to claim 1 or 2, wherein said stored configuration information comprises
- a first list (201) associating each intended feeder ID with a component ID (204') indicative of the type of component to be contained in the corresponding feeder (203),
25 and
- a second list (207) associating feeder slots IDs (208) with component IDs (204).
4. Method according to claim 1, 2 or 3, further comprising, in connection with mount of a component reel in a feeder,
30 - imaging the feeder ID of said feeder with a further camera,
- calculating data indicative for the position of said feeder ID relative to a reference point related to said feeder, and

- storing in a database said data for use as configuration information.

5. Method according any of the claims 1-4, further comprising

- for the image analysis providing by calibration a series of position coordinates, where each position coordinate is associated to a slot ID (208) of a feeder slot (103) in said series of feeder slots,

- assigning an actual position coordinate to each of these actual feeder IDs and associating each actual feeder ID to a respective slot ID.

6. Method according to claim 5, wherein the slot distance between adjacent slots (103) in said series of feeder slots is constant and wherein said calibration for associating position coordinates to the slot ID (208) of each feeder slot (103) comprises

- determining for each particular feeder slot (103) the number of slots from the first slot to the particular feeder slot,

- adding to the position coordinate of the first slot coordinates equivalent to the distance from the first slot to the particular feeder slot, where this distance is calculated as the slot distance between adjacent slots times the number of slots from the first slot to the particular feeder slot.

7. Method according to claim 5 or 6, wherein said calibration for associating position coordinates to the slot ID (208) of each feeder slot (103) comprises providing a position mark (111) with a certain fixed distance to said series of feeder slots, imaging said position mark together with said series of feeder slots, and calculating the position coordinates in relation to said position mark.

8. Method according to claim 6 or 7, wherein said series of feeder slots are mounted on a displaceable platform (102) with a predetermined rest position or predetermined start position, wherein said calibration for associating position coordinates to the slot ID is performed using an image taken in the rest position or start position of said platform (102).

9. Method according to any of the claims 1 to 8, wherein said check for configuration errors comprises

- determining (212) from stored configuration information (201, 207) the intended feeder IDs (203) of those feeders (104) that are intended to be installed in respective slots in said series of feeder slots (103),
- checking by comparing (211) the actual feeder IDs with the intended feeder IDs (203) in the respective slots, whether the actually installed feeders in the feeder slots correspond to the intended feeders, and if this is not the case, indicating (209) this discrepancy.

10. Method according to claim 9, further comprising

- determining for each of those intended feeders an intended position coordinate, said intended position coordinate taken from said series of position coordinates,
- checking (206) for each intended position coordinate, whether an actual feeder ID is assigned to said position, and indicating (209) if this is not the case.

11. Method according to any of the claims 1 to 10, further comprising

- for each actual feeder, determining from stored configuration information (201) a first component ID (204') for the type of components actually contained in said actual feeder, where said stored configuration information comprises a first list (201) associating each intended feeder ID with a component ID (204') indicative of the type of component to be contained in the corresponding feeder (203),
- for each slot (208) defined to contain a feeder, determining from stored configuration information (207) the second component ID (204) for the component that is supposed to be contained in a feeder (104) in said slot (103), where said stored configuration information comprises a second list (207) associating feeder slots with component IDs,
- checking (213) whether the first (204') and the second component ID (204) are equal, and if this is not the case, indicating (209) this discrepancy.

12. Method according to any one of the preceding claims, wherein the placement machine (101) is of the type where splicing is applicable, wherein the method further

comprises image recognition of a label at the splicing region of the component reel in a feeder (104) and storing the data and time for the use of components from a spliced reel.

- 5 13. Method according to any one of the preceding claims, wherein the obtained image is analyzed for recognition of components from a feeder and for determination, whether the components from a feeder in a feeder slot corresponds to components intended to be taken from that feeder.
- 10 14. Method according to any one of the preceding claims, wherein the obtained image is analyzed for recognition of the reel pitch.
- 15 15. System for a method according to any of the preceding claims, wherein the system comprises a component placement machine (101) having a series of feeder slots (103) for holding component feeders (104) with feeder markers, each feeder marker carrying a unique feeder ID, wherein each feeder slot (103) has a unique slot ID (208), characterized in that the system also comprises
- at least one digital camera (107) for providing a digital image (202) spanning over said series of feeder slots (103),
 - 20 - an image analysis system functionally connected to said camera and being configured to perform image analysis (205) on said image for determining (210) the actual feeder IDs carried by the actually installed feeders (114) in said series of feeder slots (103),
 - and a computer functionally connected to said image analysis system and configured
 - 25 to use the information determined by said image analysis system in comparison with stored configuration information (201, 207) to check for configuration errors.